A134 Application of Clostridiopeptidase A for DNA Isolation of Bone Specimens

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After attending this presentation, attendees will understand the principle of this method to process bone samples prior to DNA isolation.

This presentation will impact the forensic science community by developing a method to potentially increase the yield of DNA isolation from bone samples.

Bone is difficult to process for isolating DNA, which presents one of the greatest challenges when attempting to identify victims through the analysis of DNA from bones. In addition, quantities of samples recovered may be too small to properly isolate sufficient amounts of DNA. Strategies to improve the yield of DNA isolation are needed to obtain an adequate quality and quantity of DNA templates.

The bone osteocytes containing DNA are embedded in a calcified matrix, which is a barrier preventing the isolation of the DNA from the osteocytes during the extraction process. Therefore, it is necessary to remove the matrix to improve the yield of DNA. The application of proteinase K is one approach to digest this matrix barrier.

Identifying other proteinases for digesting the matrix of bone tissue and optimizing proteinase treatment were of interest. Collagenases, in particular, are known for playing a role in the degradation of bone matrix proteins. Clostridiopeptidase A is one of the most potent collagenases; thus it was chosen for this study. In this study: (1) the characterization of the effect of clostridiopeptidase A on bone degradation have been carried out; and, (2) the characterization of the effect of clostridiopeptidase A treatment on DNA isolated from bones have been conducted.

This study revealed that clostridiopeptidase A is potent for bone degradation. The application of clostridiopeptidase A can achieve speedy and effective bone degradation. Thus, this method reduces digestion time. The STR analysis detected no adverse effects on DNA profiles after the clostridiopeptidase A treatment. The potential application of clostridiopeptidase A to the isolation of DNA in bone will be presented. The quality of the isolated DNA will be assessed.

Bone, Clostridiopeptidase A, Forensic DNA

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